

With respect to the rejection of claim 1, applicants respectfully disagree with the Examiner's reading of the Furnival '074 patent. The Examiner points to reference numeral 10 of the Furnival figures, and cites lines 15 and 16 of the abstract, and line 1 of column 2 stating that these disclose a flexible substrate in the prior art. In fact, the substrate indicated by numeral 10 and at line 1 of column 2 is a rigid substrate as indicated in lines 1 and 2 of column 2. The Furnival patent specifically states that the printed circuit substrate 10 is "of the rigid variety" and this is in the very next line after the line pointed to by the Examiner. In addition, the first line of the abstract states that a single-sided printed circuit board "on a rigid substrate" is prepared in a conventional manner. Thus, it is clear that the structure referred to by the Examiner as being flexible was particularly stated by the prior art inventor to be "rigid" at a number of locations.

The reference at the end of the abstract to a flexible substrate refers to the material 22 which is cut by a piercing tool. This is also seen in column 2, beginning at line 50. This reference to the flexible substrate is a completely different part of the structure and is unrelated to the actual substrate which is the subject matter of the claims. Thus, the flexible substrate as referred to in Furnival is a completely different structure, positioned at a different location and does not correspond to the substrate 10 which is instead referred to by Furnival as a rigid substrate.

Certainly, the flexible substrate 32 of Furnival does not contain a plurality of contact pads on its first surface as called on in claim 1. Further, it does not contain the strain release structure positioned between two of the plurality of contact pads. Thus, to the extent the Examiner may be relying upon this flexible substrate 32 of Furnival, it is clear that it is missing all of the other claimed elements of the present invention. The reference to a flexible substrate is found beginning on line 50 of column 2, in which an alternative embodiment is described, wherein a flexible substrate is bonded to the rigid substrate 10, which naturally would render that flexible substrate rigid along with the underlying substrate 10. Thus, Furnival does not teach a flexible substrate, as the term is claimed by the applicants.

Indeed, it appears that Furnival clearly understands the difference between a flexible substrate and rigid substrate. He refers to the substrate 10 as being rigid as compared to the material 32, which he calls flexible. Thus, in Furnival's own description using his own relative terms, it is clear that he believes his substrate 10 to be rigid as compared to other

materials, such as the substrate 32 which he refers to as being flexible. Thus, it is clear that Furnival has an understanding of what is meant by a rigid substrate and a flexible substrate since he used both terms meaning quite different structures and it is equally clear that his application fails to teach strain relief structures positioned in a flexible substrate.

The Examiner has cited the enlarged pads 14 of Figure 1 and in Furnival's specification at column 2, line 8, as being analogous to the contact pads of claim 1. Reading further in column 2 from line 8, we find that the enlarged pads 14 are "at each site where an interconnection to the opposite face of the board is desired." In contrast, the applicants use the term contact pad to refer to a pad intended to make contact with a contact or connector of another device. Examples of this may be found throughout the applicants' specification, but one example may be found on page 5, first paragraph, which reads, beginning at line 4, "the contact pads 14 on the flexible connector 10 are required to make contact with the circuit board contact pads 32." The enlarged pads 14 of Furnival are intended to provide a connection point from the opposite face of the same substrate. An examination of Furnival's Figure 3 shows the tab 22 passing from a trace 18 on one surface of the board 10 through the aperture 16 and through the enlarged pad 14 on the opposite surface, where it is soldered at 23. Employing such a solder joint as a contact pad with another connector, in repeated contacts, as described in the applicants' specification, would quickly destroy the solder joint. Clearly the enlarged pads 14 cannot be regarded as contact pads.

The Examiner has indicated Furnival's aperture 16 as being analogous to the strain relief structure of claim 1, and points to Figure 2 as showing this aperture positioned between two of the plurality of contact pads. As previously pointed out, the enlarged pads 14 are not contact pads, and thus apertures between them are not between contact pads. Furnival indicates in column 2, line 63 that the flexible substrate, previously discussed, "may extend beyond the boundaries of the substrate 10, to serve...as a preformed cable leading to a connector or another circuit unit." However, the hypothetical connector is not enabled, or even described in simple terms, and contact pads that might presumably exist thereon are not revealed as having apertures therebetween, nor would such a case be remotely obvious. For at least the reasons discussed above, applicants believe that claim 1 is allowable over Furnival. Additionally, claims 2 through 8, as dependent claims on claim 1, are also allowable.

With reference to the rejection of claim 2, applicants believe that claim 2 is allowable on its own merits, apart from its dependence from an allowable claim. The Examiner has indicated aperture 16 as being equivalent to the strain relief structure of claim 1 and 2. Referring to Furnival, column 2, beginning at line 39, we find that "the tab 22 has a strain relief design that is due to the horizontal portion 24 of the tab 22." Thus, we find that the strain relief characteristics of Furnival's device come not from the apertures but rather from the tab 22 and the horizontal portion 24 thereof. Furnival continues, pointing out that this arrangement provides relief from stresses caused by thermal expansion, rather than flexing of the substrate as is described in the applicants' specification. Thus, claim 2, which claims an aperture as a strain relief structure, is allowable over Furnival.

With reference to the rejection of claim 9, applicants feel that many of the arguments put forward in support of the allowability of claim 1, may also be reasonably applied in support of claim 9. For example, claim 9 claims a flexible substrate. Furnival in contrast indicates that a rigid substrate is preferable. Claims 9 claims a plurality of contact pads arranged in a regular configuration. In contrast, Furnival fails to show any contact pads, but rather, enlarged pads intended for interconnection to the opposite face of the substrate, arranged in a haphazard arrangement as required for such connections. Additionally, claim 9 claims a plurality of apertures arranged in a regular configuration and intercalated into the plurality of contact pads. As previously indicated, Furnival does not teach contact pads, and thus the apertures cannot be intercalated therebetween. Furnival's apertures are, of necessity, as haphazardly arranged as the enlarged pads. For these reasons, at least, claim 9 is allowable over Furnival.

With reference to the rejection of claim 10, applicants believe that claim 10 is also allowable over Furnival, for at least the following reasons: claim 10 claims forming, on a first surface of a flexible substrate, a plurality of contact pads while Furnival does not teach the formation of contact pads; claim 10 claims "forming, between two of the plurality of contact pads, a strain relief structure," while, as previously discussed with reference to claim 1, the strain relieve provided by Furnival's structure relieves strain between connections on opposing surfaces of the substrate, rather than between pads on a first surface, as claimed in claim 10. Claim 10 is therefore allowable over Furnival, together with dependent claims 11 through 13.

New claims 14 through 17 are submitted to provide coverage for additional aspects of the invention, and are fully supported and enabled by the specification.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version With Markings to Show Changes Made.**"

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,

Stephen V.R. Hellrigel et al.

SEED Intellectual Property Law Group PLLC



Harold H. Bennett II

Registration No. 52,404

HHB:wt

Enclosure:

Postcard

701 Fifth Avenue, Suite 6300
Seattle, Washington 98104-7092
Phone: (206) 622-4900
Fax: (206) 682-6031